

REQUIREMENT 22

DETAILED REQUIREMENTS FOR SELECTED RF DEVICES

22. General. This section describes detailed requirements for a DPA of commonly used RF devices. These requirements supplement the general requirements in section 4. Examples of typical configuration sketches are included. When applicable, specification numbers or type numbers are referenced to assist in identification. Pre-DPA tests, such as functional tests and solderability tests, are assumed to have been satisfied by normal inspection and testing and are therefore not addressed.

22.1 Attenuators, coaxial.

22.1.1 Method.

22.1.1.1 External visual examination. Examine the attenuators at 20 X minimum magnification for defects in the external construction, marking, SMA connectors, and workmanship.

22.1.1.2 Radiography. Perform radiographic inspection to determine the orientation of the ceramic substrate within the device.

22.1.1.3 Disassembly. Disassemble one third of the devices (round up) by untorquing the SMA connectors on each end of the device. If the connectors are welded or epoxied into position, cut through the weld or attach area prior to disassembly. Subsequently, ground clip tension shall be tested by measuring the substrate pushout force. If not specified in the part control drawing, the minimum pushout force shall be two pounds. The substrate card and associated assemblies shall then be examined for any workmanship defects such as severe scratches in the resistor element or cracks in the substrate.

22.1.1.4 Cross-sectioning. One third (round down) of the devices shall be encapsulated in epoxy in an orientation which will allow the substrate card to be sectioned to reveal its end termination attachment points and which is in a plane incident to its flat dimension. The devices shall be sectioned in a plane parallel to the longitudinal axis of the devices. Care should be taken to backfill the internal cavity(s) of the device(s) during sectioning to support the internal substrate(s). Section to the midpoint of the attenuator body and examine the substrate card to SMA connector interface at a minimum of 100X magnification to ensure an adequate contact has been made (spring contact or solder pin attach). Any obvious defects in the attachment scheme shall be noted and images recorded. Examine for any other sign of workmanship deficiencies in the overall assembly.

22.1.1.5 Chemical dissolution. The remaining third of the devices shall be immersed in a 1:1 ratio mixture of nitric and hydrochloric acid (Aqua Regia) until the case, connectors, internal substrate mounting card assembly, and attached pins have been completely dissolved. The exposed ceramic attenuator substrate card shall then be inspected for any signs of cracking along all of its active surfaces. A dye penetrant or transmitted light technique shall be utilized. For devices with solder attached pin design, the inspection shall be focused on the pin attach area. Any surface cracks in the active resist area which exceed 0.12 mm (.005 inch) in length or penetrate more than half the depth of the substrate shall be cause for rejection.

22.1.2 Data records. DPA findings that deviate from the specified configuration or other requirements shall be documented as defects.

22.2 DC block/monitor tee.

22.2.1 Method.

22.2.1.1 External visual. Examine the devices at 20X minimum magnification for defects in the external construction, marking, SMA connectors, and workmanship.

22.2.1.2 Cross-sectioning. All of the devices shall be encapsulated in an orientation allowing for sectioning in a plane parallel to the longitudinal axis of the device. Care should be taken to backfill any internal cavities to support the internal members. Section to the midpoint of the device and examine the DC load to SMA connector interfaces at a minimum of 100X magnification to ensure an adequate contact has been made (spring contact and metal to metal contact). Any obvious defects in the attachment scheme shall be noted and images recorded. Examine for any other sign(s) of workmanship deficiencies in the overall assembly.

22.2.2 Data records. DPA findings that deviate from the specified configuration or other requirements shall be documented.

22.3 Detectors, coaxial and waveguide.

22.3.1 Method.

22.3.1.1 External visual. Examine the devices at 20X minimum magnification for defects in the external construction, marking, SMA connectors, and workmanship.

22.3.1.2 Radiography. Perform radiographic inspection in two views in accordance with method 2012 of MIL-STD-883. Use radiographs as an aid in the delid process.

22.3.1.3 Disassembly. Disassemble all of the devices by untorquing the SMA connectors on each end of the device. If the connectors are welded or epoxy staked into position, cut through the weld or staking area prior to disassembly. Carefully remove the barrel assembly. Delid the barrel assembly carefully so that no damage is introduced to the interior. Perform a visual inspection in accordance with method 2017 of MIL-STD-883 as appropriate. In addition, examine for any other deficiencies in the device workmanship.

22.3.1.4 Bond pull testing. Perform bond pull tests on all wire bonds in accordance with method 2011 of MIL-STD-883, condition D.

22.3.1.5 SEM. Perform SEM inspection of all internal attachments (bonds, die attachments, solder joints, etc.). Additionally, perform SEM inspection in accordance with 16.1.1.8 herein on all discrete expanded metallization semiconductor die.

22.3.1.6 Die shear testing. Perform die shear testing, as appropriate, in accordance with method 2019 of MIL-STD-883 on 50 percent of the device within the lot (round down).

22.3.2 Data records. DPA findings that deviate from the specified configuration or other requirements shall be documented.